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Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

1. (withdrawn) An image processing apparatus, comprising:

an input unit inputting a color signal of a color space;

a designating unit designating a color range according to the input color signal;

a black amount determining unit determining an amount of black for the input color signal by referring to a black generation condition corresponding to the designated color range,

wherein the designated color range is a range where a difference between a maximum amount of black and a minimum amount of black is small.

2. (withdrawn) The image processing apparatus as claimed in claim 1, wherein the color signal of the color space includes components of lightness, chroma, and hue.

3. (withdrawn) The image processing apparatus as claimed in claim 1, wherein the designated color range is situated on a line passing through a basing point and a maximum chroma point, wherein the black generation condition defines a black generation function according to the maximum amount of black and the minimum amount of black of the designated color range.

4. (withdrawn) The image processing apparatus as claimed in claim 3, wherein the basing point is a black point.

5. (withdrawn) The image processing apparatus as claimed in claim 3, wherein the black generation function is inputted with a value of a distance between the basing point and the input color signal.

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6. (withdrawn) The image processing apparatus as claimed in claim 1, wherein when a black starting point situated on the line passing through the basing point and the maximum chroma point is Si, and when another black starting point situated on a line passing through the basing point and a white point is Li, the black amount determining unit determines the amount of black according to the black generation condition, and coordinates for the basing point, Si, Li, and the input color signal.

7. (withdrawn) The image processing apparatus as claimed in claim 1, wherein the black amount determining unit determines the amount of black by normalizing the black generation function according to the input color signal.

8. (withdrawn) The image processing apparatus as claimed in claim 6, wherein Si and Li are designated according to a factor leading to image degrading.

9. (withdrawn) The image processing apparatus as claimed in claim 6, wherein Si and Li are designated according to a range of a prescribed color.

10. (withdrawn) The image processing apparatus as claimed in claim 6, wherein Si and Li are designated according to a characteristic of an output apparatus.

11. (withdrawn) The image processing apparatus as claimed in claim 6, wherein Si is designated according to the hue of the input color signal.

12. (withdrawn) The image processing apparatus as claimed in claim 6, wherein Si is designated according to a length of a line connecting the basing point and the maximum chroma point.

13. (withdrawn) The image processing apparatus as claimed in claim 6, wherein Si is designated according to black starting point data for hues of Red, Green, Blue, Cyan, Magenta,

and Yellow.

14. (withdrawn) The image processing apparatus as claimed in claim 8, wherein Si is designated according to the hue of the input color signal.

15. (withdrawn) The image processing apparatus as claimed in claim 8, wherein Si is designated according to a length of a line connecting the basing point and the maximum chroma point.

16. (withdrawn) The image processing apparatus as claimed in claim 8, wherein Si is designated according to black starting point data for hues of Red, Green, Blue, Cyan, Magenta, and Yellow.

17. (withdrawn) The image processing apparatus as claimed in claim 10, wherein Si is designated according to the hue of the input color signal.

18. (withdrawn) The image processing apparatus as claimed in claim 10, wherein Si is designated according to a length of a line connecting the basing point and the maximum chroma point.

19. (withdrawn) The image processing apparatus as claimed in claim 10, wherein Si is designated according to black starting point data for hues of Red, Green, Blue, Cyan, Magenta, and Yellow.

20. (withdrawn) An image processing method comprising the steps of:
a) inputting a color signal of a color space;
b) designating a color range according to the input color signal; and
c) determining an amount of black for the input color signal by referring to a black generation condition corresponding to the designated color range,

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wherein the designated color range is a range where a difference between a maximum amount of black and a minimum amount of black is small.

21. (withdrawn) An image processing method comprising the steps of:

a) inputting a color signal of a color space;

b) designating a color range according to the input color signal;

c) determining an amount of black for the input color signal by referring to a black generation condition corresponding to the designated color range; and

d) creating a table indicative of the amount of black determined in step c),

wherein the designated color range is a range where a difference between a maximum amount of black and a minimum amount of black is small.

22. (withdrawn) A program recorded to be executed with an image processing apparatus, comprising the steps of:

a) inputting a color signal of a color space;

b) designating a color range according to the input color signal; and

c) determining an amount of black for the input color signal by referring to a black generation condition corresponding to the designated color range,

wherein the designated color range is a range where a difference between a maximum amount of black and a minimum amount of black is small.

Claims 23-31 (canceled).

32. (currently amended) An image processing method for converting a color signal, being input to an image output apparatus, into a color material signal, the image processing method comprising the steps of:

defining a first line;

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defining one or more second lines;

defining one or more third lines;

~~allocating~~ determining one or more color material signals on the first, second, and third

lines; and

obtaining a color material signal situated between any of the first, second, and third lines

by interpolation according to the first, second, and third lines,

wherein the first line is an achromatic line in a reproducible color range of the image

output apparatus, the one or more second lines are one or more lines situated on an outermost

boundary line of the reproducible color range, and except for the achromatic line, the one or

more third lines are one or more lines situated within the reproducible color range of the image

output apparatus;

wherein the first line is a line extending between white and black, the one or more second

lines are one or more lines extending between black and a primary color and/or a secondary

color, and the one or more third lines are one or more lines passing through a color range for

memory color;

wherein the memory color includes human skin color, ocean blue color, sky blue color,

and plant green color;

wherein the first line is a line extending between white and black, the one or more second

lines are one or more lines extending between black and a primary color and/or a secondary

colors, and the one or more third lines are one or more lines connecting black with one or more

points situated between white and a primary color or a secondary color;

wherein the amount of black for each point on the first, second and third lines is

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determined according to a distance from black:

wherein a black starting point for the third line starts later compared to black starting points for the other lines.

Claims 33-36 (canceled).

37. (currently amended) The image processing method as claimed in claim 32, wherein the one or more color material signals ~~allocated~~ on the first, second, and third lines are one or more signals of same color having different density.

38. (currently amended) The image processing method as claimed in claim 32, wherein the one or more color material signals ~~allocated~~ on the first, second, and third lines are one or more signals of black.

39. (currently amended) The image processing method as claimed in claim 38, wherein the one or more color material signals of black ~~allocated~~ on the one or more third lines are ~~allocated~~ utilized to determine a maximum amount of black for a ~~black~~ signal situated between the first line and the one or more third lines.

40. (currently amended) The image processing method as claimed in claim 38, wherein the one or more color material signals of black ~~allocated~~ on the one or more second lines are ~~allocated~~ utilized to determine a maximum amount of black for the one or more color materials

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of black and obtain a maximum range for the reproducible color range.

41. (currently amended) The image processing method as claimed in claim 38, wherein

the one or more color material signals of black are ~~allocated~~ determined to be black starting

points at which graininess is unnoticeable.

42. (currently amended) The image processing method as claimed in claim 32, wherein

the one or more color material signals are ~~allocated~~ determined according to a designation of a

user.

43. (original) The image processing method as claimed in claim 32, wherein the one or

more third lines are controlled according to a characteristic of an input image.

44. (original) The image processing method as claimed in claim 32, further comprising a

step of creating a table indicative of the obtained color material signal corresponding to the input

color signal.

45. (original) An image processing apparatus comprising:

a CPU,

wherein the CPU converts an input color signal into a color material signal by referring to

the table as set forth in claim 44.

46. (new) An image processing method for converting a color signal, being input to an image output apparatus, into a color material signal, the image processing method comprising the steps of:

defining a first line;

defining one or more second lines;

defining one or more third lines;

determining one or more color material signals on the first, second, and third lines; and

obtaining a color material signal situated between any of the first, second, and third lines by interpolation according to the first, second, and third lines,

wherein the first line extends between white and black, the one or more second lines extend between black and a primary color and/or a secondary colors, and the one or more third lines connect black with one or more points situated between white and a primary color or a secondary color,

the amount of black for each point on the first, second and third lines is determined according to a distance from black, and

a black starting point for the third line starts later compared to black starting points for the other lines.

47. (new) The image processing method as claimed in claim 46, wherein the one or more color material signals of black are determined to be black starting points at which graininess is unnoticeable.

48. (new) The image processing method as claimed in claim 46, wherein the one or more color material signals on the first, second, and third lines are one or more signals of black.

49. (new) The image processing method as claimed in claim 48, wherein the one or more color material signals of black on the one or more third lines are utilized to determine a maximum amount of black for a black signal situated between the first line and the one or more third lines.

50. (new) The image processing method as claimed in claim 48, wherein the one or more color material signals of black on the one or more second lines are utilized to determine a maximum amount of black for the one more color materials of black and obtain a maximum range for the reproducible color range.

51. (new) The image processing method as claimed in claim 46, wherein the one or more color material signals are determined according to a designation of a user.

52. (new) The image processing method as claimed in claim 46, wherein the one or more third lines are controlled according to a characteristic of an input image.

53. (new) The image processing method as claimed in claim 46, further comprising a step of creating a table indicative of the obtained color material signal corresponding to the input color signal.

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54. (new) An image processing apparatus comprising:

a CPU,

wherein the CPU converts an input color signal into a color material signal by referring to

the table as set forth in claim 52.